DEPARTMENT OF THE INTERIOR, CANADA
Hon. Frank Oliver, Minister; W. W. Cory, Deputy Minister
FORESTRY BRANCH—BULLETIN No. 17
R. H. Campbell, Superintendent of Forestry

REPORT ON TIMBER CONDITIONS, ETC., ALONG THE PROPOSED ROUTE OF THE HUDSON BAY RAILWAY

BY

J. R. DICKSON, B.S.A., M.S.F.

Assistant Inspector of Dominion Forest Reserves.

OTTAWA
GOVERNMENT PRINTING BUREAU
1911

Mitishto Portage, showing effects of fire, 1908.

DEPARTMENT OF THE INTERIOR, CANADA
Hon. Frank Oliver, Minister, W. W. Cory, Deputy Minister
FORESTRY BRANCH—BULLETIN No. 17
R. H. Campbell, Superintendent of Forestry

REPORT ON TIMBER CONDITIONS, ETC., ALONG THE PROPOSED ROUTE OF THE HUDSON BAY RAILWAY

BY

J. R. DICKSON, B.S.A., M.S.F.

Assistant Inspector of Dominion Forest Reserves.

OTTAWA
GOVERNMENT PRINTING BUREAU
1911

270—1½

FORESTRY BRANCH.

OTTAWA, January 30, 1911.

SIR,—I submit herewith a report by Mr. J. H. Dickson on his inspection of the timber along the line of the proposed Hudson Bay railway from The Pas to Split lake, being for a distance of some 235 miles along the line of railway. The line of inspection followed was along the waterways on the northwest side of the proposed line of railway from which men were sent out at intervals of a few miles in each direction so as to locate the timber. On the return journey the waterway route to the south of the line was taken and similar inspections made from it. As a result a good idea of the character and location of the timber along the line has been obtained, as shown by the map prepared to accompany the report.

Unfortunately it appears that there is very little timber of merchantable size in the district, most of it being below 8 inches in diameter. This has apparently been caused by several large general fires which occurred in years past, and also by the fact that a large part of the country is poorly drained and the growth of the trees in consequently slow.

The tamarack, which would be most suitable for timber for construction purposes of the railway, does not occur in any large quantity, and most of what was found was destroyed by insects. The merchantable timber is mostly white spruce which is not a very strong or enduring timber for construction purposes. It will have to be used for this purpose, however, to a considerable extent since other timber is not available.

Mr. Dickson's report describes the district covered and gives the details of the location and quantities of timber. I think it would be desirable to have the report and maps accompanying it published as a special bulletin.

I have the honour to be, sir,

Your obedient servant,

R. H. CAMPBELL,

Superintendent of Forestry.

W. W. CORY, Esq., C.M.G.,

Deputy Minister of the Interior.

REPORT OF HUDSON BAY SURVEY PARTY'S WORK DURING SEASON OF 1910.

DAUPHIN, December 14, 1910.

R. H. CAMPBELL, Esq.,
Superintendent of Forestry,
Ottawa.

SIR,—I beg to submit the following report, and maps to accompany, covering the work done during the summer of 1910 by the Hudson Bay survey party of the Dominion Forestry Branch.

INTRODUCTORY.

Under your instructions, on May 15 I left Winnipeg for The Pas with Messrs. D. R. Cameron, J. A. Doucet, and J. L. Bremner, as assistants. There, after considerable difficulty, I secured four Indian canoemen and a cook, and on arrival of our supplies, left on May 26 for Moose lake and the north. Fire Ranger Lamb, of Moose Post, kindly assisted me as far as Mitishto portage at the north end of Moose lake.

We met great difficulties in getting out outfit across the muskegs of this nine-mile portage. Mr. Bremner's knees both became rheumatic and on my advice he reluctantly decided to return. Our best Indian, Philip Tabaka, fell with a heavy pack and injured his lung, so that I was obliged to detail another Indian to return with him and bring a fresh man from The Pas. What with the delays caused by this portage, by storms on Moose lake, by sickness, sore feet and lack of men, it was June 25th before we got settled to work.

From June 8 till July 8 (that is until Setting lake was reached) the men making inspections were wading in muskeg every day. Except for a varying percentage of rock outcrop, usually in the form of low ridges covered by stunted jack pine, this great muskeg extends northeast along the whole course of the Mitishto river, and appears in fact to blanket the entire watershed, in this region, between the Saskatchewan and Grass river systems.

From Setting lake to Cross lake, by way of Paint, Wintering, Landing and Sipiwesk lakes, we traversed part of the so-called 'clay-belt' which contains upon the whole from 50 per cent to 75 per cent of arable land and probably has a good agri-

cultural future. From Cross lake we returned again by Minago river, Moose lake and the Saskatchewan to The Pas, arriving there on September 20.

During the season we had 65 main camps and 25 sub-camps. The comparative absence of merchantable timber permitted us to travel almost constantly, and cover for the purposes of the survey a large area of country. Being merely a rapid reconnaissance to locate timber, the area covered cannot be stated with more than approximate accuracy. After a study of our maps I place it at 8,000 square miles.

NATURE OF THE SEASON.

Whereas in many parts of the continent the summer of 1910 was a peculiarly dry one, in Keewatin it was just the opposite. Rain fell frequently, and high winds, especially nor'easters from Hudson bay, were almost constant and occasioned us some loss of time on the larger lakes. The rain, while disagreeable, was a blessing in disguise, for it served the double purpose of preventing fires and keeping the air free from smoke, so that we were able to devote our full time to the survey under favourable conditions for rapid, accurate work.

PERSONNEL OF PARTY.

There were nine persons in the party—a cook, four Indian canoemen and packers, three field assistants and myself. Throughout the season the members of the party worked together most harmoniously and did excellent work. It is rather important to have all one's Indians from the same village, they work together more cordially. The success of the party as to amount of work done and freedom from accident was largely due to the efficiency of the field assistants in the woods, and the unvarying caution and skill of the Indians as voyageurs.

MAPS.

The map supplied us in starting was found in actual use to be frequently incorrect, and made us lose considerable time in places where our Indians were unacquainted with the country. We have prepared a map from our inspections which is submitted herewith, and which, while still merely a sketch map, gives a correct idea of the location of the patches of merchantable timber met with, and an approximately true outline of the several large lakes explored, with the position of their numerous islands. Using this map, a traveller could readily find his way, for instance, down the intricate channels of the Nelson, and through such river-expansions as Paint or Sipiwesk lakes—hitherto merely a confusing, uncharted maze of islands. The general scale is two-thirds of an inch to the mile, and as closely as practicable the conventions and colouring are according to the forest atlas legend of the Forestry Branch.

OBJECTS SOUGHT.

In accordance with instructions received the central object of the party was to make a rapid reconnaissance survey of the country adjacent to the proposed route of the Hudson Bay railway between The Pas and Split lake: the work of such a survey being in this case to locate, estimate, and map in the areas of commercially

valuable timber that could be made use of in the work of constructing the railway. Any such timber within eight miles of the line was classed as available, and beyond this distance wherever waterways give access. Timber under 8 inches in diameter at breast-height was considered not merchantable—as being too small for industrial use. All areas not timbered commercially—i.e. carrying only young growth of no marketable value—were passed over with a general description of the existing growth as to species, size, and quality. Areas of greater or less agricultural value were mapped in when possible, and a study made of their local flora, natural products and probable cropping possibilities.

PLATE II.

Crossing Mitishto Portage. "Only timber for miles is this dwarfed moss-covered tamarack."

A second object considered almost as important as the above was that of fire-ranging or patrol work. A constant lookout for forest fires was maintained and the various travellers met with were urged to acquire the habit of extinguishing their camp fires. White men were found much more careless in this respect than the Indians. In addition, durable fire notices written in English, Cree and Chipewyan were posted at trading posts, portages and camping places along our route.

METHODS.

All along the chain of water-courses and lakes which we followed (the relation of this route to the railway line being hereinafter shown), inspection lines by compass were run back into the adjoining country at three to six mile intervals and tied in to the railway survey to locate them upon our map. The men inspecting the strips worked singly, and were able to travel from four to six miles from the line and return each day. Field glasses were carried and by climbing tall trees at advantageous points it was possible to examine the surface of the country and nature of

the tree growth in a sufficiently thorough and satisfactory way. That region is a specially favourable one for rapid and accurate descriptive work, being everywhere so monotonously uniform in character. The men, while on field work, also took notes on the forest types, drainage, soil conditions and reproduction, which I later condensed to the compass of my diary, and submit as part of this report.

DESCRIPTION OF ROUTE FOLLOWED

SHOWING ITS RELATION TO THE LOCATION LINE OF THE HUDSON BAY RAILWAY.

(See Appendix for Detailed Timber Estimates.)

THE PAS TO MOOSE LAKE.

From The Pas the proposed railway line runs almost due northeast for fifty miles to Frog river at the extreme northwest angle of Moose lake. Where not in muskeg it follows the low limestone ridges bordering the easterly shores of Clearwater and Cormorant lakes. Along this section the timber within reach of the line is all small, spindly black spruce, or jackpine under 8 inches in diameter, save for bluffs of white spruce bordering the shores of the lakes. These bluffs are probably too small and scattered, however, for a contractor to lumber them at a profit.

Owing to the abnormally low water conditions, I was forced to take our outfit to Frog creek by way of the Saskatchewan river and Moose lake, being thus unable to parallel the railway line, but, as this section lies next The Pas, the local fire-rangers, railway engineers, and trappers were able to give a sufficiently accurate description of the timber conditions therein.

MOOSE LAKE.

This is the largest lake we met with during the season. Its form is roughly that of a cross, about eighty miles each way. Most of the good spruce scattered along its shores is already alienated in the six existing timber berths, but along the northern arm there is probably enough still unlicensed to yield 50,000 railway ties and 145,000 feet B.M. Owing to the necessity for crossing Mitishto portage at once, I could not make a careful examination of this Moose lake timber. A party might begin here next season and pass by way of William lake to the Upper Nelson. The Indians report heavy timber round William lake.

As the railway will touch Moose lake near the mouth of Frog creek, the available timber could be boomed to it there quite cheaply. By drawing on the timber berth supplies at least 350,000 ties might be obtained on Moose lake.

THE MITISHTO RIVER.

From Moose lake we crossed over a low divide [illegible] headwaters of Mitishto ('limestone') river, and descended this stream to its junction with the Grass river.

The final railway survey follows the southeast bank of this river almost to its mouth, thence passes easterly around the south end of Setting lake, and again proceeds northeast.

The only timber along the Mitishto, within eight to ten miles on either side of the river, is a narrow, much-broken fringe of white spruce along the lower reaches of the stream, some 12,500 ties and 350,000 feet B.M. in all. Particulars will be found in the appendix. In no place does this timber extend beyond two to five chains

from the water's edge. It is just the proper size for making hewn ties, and these could be either drawn direct to the railway or driven down the river to a more convenient point. Save for this better drained strip along its banks, the entire country bordering the Mitishto is muskeg or semi-muskeg with no timber over 6 inches in diameter, but all closely covered with young spruce, larch and jackpine of about tent-pole size, or slightly larger.

THE GRASS RIVER SYSTEM.

The Grass river flows out of Wekusko lake, which is located seventy-five miles up river from the Mitishto confluence. The Grass river on this upper stretch is 30 to 100 yards in width and 20 to 30 feet deep, and contains five rapids and eight falls of 5 to 25-foot drop. It would be a very difficult stream to drive. Past fires have swept all timber of commercial value from the country of rock and muskeg through which it flows, but around Wekusko lake there are scattered patches of mature timber.

I found in all one and one-half square miles of merchantable white spruce, which at 2,000 ft. B.M. and 100 ties per acre, will yield some two million feet of saw material and one hundred thousand ties. This spruce is 8 to 20 inches in diameter, 80 to 100 feet high, and well cleaned. The largest trees, however, are rapidly being killed by bark beetles or windthrown, and as the danger of fire is enormous, the whole is all but certain to be destroyed in the near future. All the rest of the country surrounding Wekusko lake is brûlé, carrying young birch, poplar, or jackpine of varying age, and usually a heavy debris of small dead timber. This fireswept country extends away from the lake in all directions as far as a field-glass can reach from the highest points, and is sprinkled here and there with larger spruce trees standing singly or in small groups—the remnants of the old stand, and never in sufficient quantity to interest a lumberman.

Wekusko lake is eighteen miles long north and south, by six to eight east and west, deep, and an excellent whitefish lake. The rock formation in which it lies has been much disturbed. It is for the most part a dark plutonic granite or diabase mixed with serpentine slate, and quartz, and shows indications of graphite and copper.

It is doubtful if this Wekusko lake timber can be lumbered and driven down to the Hudson Bay railway at a profit, because of:

1st. The difficulty and expense of getting stores in, the scattered nature of the timber, and the ruggedness of the lake shores combine to make the cost of logging high.

2nd. The great distance. It is one hundred and twenty-five miles to the south end of Setting lake, the point nearest the line for this timber, which still leaves a four-mile sleigh haul, unless a spur were run down to the lake from the railway line.

3. The fact that two tugs would be necessary: one on Wekusko lake and the other on Setting lake.

4. The numerous falls in Grass river would inevitably tear rafts to pieces, and in the muskegs between, a large percentage of the logs or ties would 'float out' and be lost, there being no banks to keep them in the river. Nor is there enough timber to repay the expenses of making slides at the falls.

Mixed muskeg fringing Mitishto River, showing tamarack and black spruce 2 – 4" D.B.H.

PAKWAHIGAN AND SETTING LAKES.

These long, narrow expansions of the Grass river lie side by side, some twenty miles below the Mitishto confluence, and both contain numerous small timbered islands. The railway line runs along the southeast side of Setting lake, being four miles distant from the south end, and eight miles from the north end. Setting lake is thirty miles long, main axis lying north 30° east and south 30° west.

On the islands and shores of these two lakes we found enough timber to supply forty thousand railway ties and one million three hundred and fifty thousand board feet of lumber. All this timber stands almost at the water's edge and could be cheaply logged and boomed to the south end of Setting lake, to which point it might pay to run a four mile spur from the railway. Back from the shore of these lakes at least so far as our lines pierced, i.e. from six to ten miles—there is absolutely no timber of present commercial value.

GRASS RIVER AND EXPANSIONS FROM SETTING LAKE TO SPLIT LAKE.

As shown by the appendix and maps this lower stretch of the Grass river, about one hundred miles in length, is a succession of island studded lakes linked together by the stream, which now becomes a very large, deep river—often half a mile in width.

The small patches of valuable spruce scattered on islands and here and there along the shores, we estimated to contain between twenty-five and thirty thousand ties, and 650,000 board feet of lumber. Much of this timber is in small isolated bluffs where it will never pay to log it even if the Churchill route were chosen, and with the possible exception of the timber on Paint lake it is all inaccessible to the proposed Nelson route. The Paint lake timber might be drawn across the three mile portage to Wintering lake and towed thence twenty miles to Landing lake portage a point within one mile of the Nelson line—but this could hardly be done at a profit.

Back from the Grass river along this stretch, the same timber conditions obtain as already noted for the Setting lake vicinity; that is to say, away from the water courses there is no merchantable timber. We did not find in fact during all the season a single exception to this general rule.

INTER-LAKES.

From guides, traders and trappers I learned that there was no commercially valuable timber along the Burntwood river, around Split lake, nor bordering the Nelson between Split lake and Manitou rapids. The party, therefore, crossed over from the Grass river to the Nelson by way of Wintering and Landing lakes. As stated, the proposed Nelson route of the railway, as now surveyed passes between these lakes, and the large amount of fine spruce on the islands—especially of Wintering lake—could be cheaply laid down at the railway. The total stand on both lakes will yield some forty thousand ties and nine hundred thousand feet of saw logs.

NELSON RIVER SYSTEM.

The banks of the Nelson river, and country for many miles inland, between Big Manitou rapids and Sipiwesk lake, have all been swept clear of mature timber

Spruce Flat Type. Spruce D.B.H. 4" +

by the recurring forest fires of past years. The Hudson Bay railway Nelson line crosses the Nelson river at Big Manitou rapids, fifty miles below Sipiwesk lake and the timber of value on the islands of this lake could easily be rafted thither. There are no falls or rapids between. On Sipiwesk lake there is timber to yield between fifty and sixty thousand railway ties and in round numbers two million board feet of lumber. One half of this timber stands on the northeast end of Bear island, the rest is scattered over the numerous other islands, as shown on the map.

Owing to the number of rapids and falls which occur on the Nelson river between Cross and Sipiwesk lakes it is hardly probable that the timber on the former could be driven down to the railway line at a profit. On Cross lake we estimated 10,000 ties and approximately three hundred thousand feet of lumber, and on Pipestone lake, an expansion of the Nelson just above Cross lake, another hundred thousand board feet could be obtained.

By making use of creeks and rivers we were able to inspect practically all the country bounded by the Grass and Mitishto rivers on the northwest and the Nelson and Minago rivers on the southeast. It is nearly level or undulating and generally speaking may be classed as a clay belt. The Nelson line traverses it, running almost due northeast. In the whole area there is absolutely no timber worth lumbering, but we saw some fine stretches of land suitable for agriculture, and easy to drain. The part of this area shown uncoloured on our map was not traversed; the evidence of our field-glasses and of the trappers met with is basis of descriptive note placed thereon.

THE MINAGO RIVER SYSTEM.

From Cross lake we returned to the east arm of Moose lake by way of the Minago river. As usual the country away from the river had all been severely fireswept and carried only young growth, but bordering the river at the various rapids is a fringe of mature spruce, estimated to contain in all three thousand ties and one and three-quarter million board feet of saw material. This timber could all be driven down to Cross lake and thence, if desired, taken on down river for use on the railway line. But in my opinion it will prove to be too remote from the railway to be profitably used in its construction.

On reaching Moose lake I discontinued field work. The following is a summary of the total timber found during the season exclusive of that on timber berths:—

SYSTEM TOTALS.

System.	Ties.	Lumber Ft. B.M.
1. Moose lake	54,500	180,000
2. Mitishto river	12,500	350,000
3. Grass river	173,050	4,065,000
4. Inter lakes	44,200	912,000
5. Nelson river	74,050	2,167,000
6. Minago river	3,000	1,750,000
Grand Total	361,300	9,424,000

If from the above the timber on Wekusko lake and lower reach of Grass river and on the Upper Nelson and Minago rivers is deducted as being commercially inaccessible to the railway, then the supply locally available for the building of this stretch of the road is reduced to approximately one-half the figures given above.

At 3,000 ties to the mile the 235 miles between The Pas and the first crossing of the Nelson will call for some 700,000 ties, in addition to piling and construction timber, so that it is probable the above local supply will prove insufficient to meet all demands.

GENERAL DESCRIPTION OF THE COUNTRY.

ELEVATION—TOPOGRAPHY—DRAINAGE.

The surface of the country is undulating to nearly level, and almost monotonous in its sameness. However away from the railway line in places, as for instance round Wekusko lake, there are areas of rough rolling granite. Wherever exposed, the bed rock has been rounded, polished, worn down nearly to a general level by the tremendous and prolonged glacial erosion of the Ice Age.

The divides between watercourses are low and poorly defined, streams frequently starting from two sides of the same muskeg. The general exposure north of Moose lake is toward the northeast, but this slope is very slight. The absolute elevation of Moose lake divide, according to the railway engineers, is 836 feet, while Split lake, 200 miles to the northeast, is 496 feet above the sea. This gives a fall of only 20 inches per running mile, or a slope of .003 per cent over that distance. Furthermore this fall is not uniform, almost exactly one-half occurs in the form of three rocky escarpments, each of which produces cataracts on rivers flowing into Hudson bay.

The most important of these declivities crosses the Grass river some twenty miles above Paint lake, where Lynx and Sandy falls occur, each with a 43 foot drop or a total of 86 feet. The above facts clearly explain the presence of the vast muskegs and sluggish drainage which obtain in that country.

It is interesting to note that the fall from Split lake to Hudson bay is exactly twice the above—500 feet in 150 miles; a slope of .006 per cent over all, or 40 inches per running mile. The whole region is intersected by a net work of lakes and streams large and small, at least 10 per cent of the gross surface of the country being water.

ROCKS AND SOILS.

The bedrock for 100 miles northeast of The Pas is limestone—probably largely dolomite—and it frequently obtrudes through the muskegs or shallow soils which blanket it. These outcrops form low, narrow, flattened ridges, rising just above the general level of the muskeg, and nearly always running northeast and southwest.

The line of contact between this limestone area and the Laurentian granite (upon which it rests unconformably) runs northwest and southeast from a point ten

miles east of Limestone bay on Lake Winnipeg across the southwest end of Hill lake on Minago river to Cameron falls on the Mitishto, thence passing in a westerly direction along the south shores of Reed, Wekusko and Cranberry lakes. Along this line, along the south shores of Reed, Wekusko and Cranberry lakes. Along this line, especially in the vicinity of Hill lake, there is a zone of deep clays of very promising agricultural value.

In the area of granite further north, the whole future, so far as agriculture or forestry is concerned, depends upon the general depth of the boulder clay. From the mere fact that it is a drift deposit this depth constantly varies, but only a detailed soil survey of each township could show where and how much. There are large areas of almost pure rock outcrop and muskeg of little or no value even for timber production. But in general, over the great clay belt the soil, which is almost uniformly a very tenacious boulder clay (nearly free of boulders, however), averages between 4 and 12 feet in depth; quite deep enough therefore for cultivation.

It must be understood that no hard and fast boundary line can be laid down as showing the confines of this clay belt. The change is often so gradual, and so many as yet unknown factors enter—as for instance, soil depth, and possibilities of drainage—that any estimate of the bounds, area and average arable content of this belt can, with our present very limited knowledge, be given only in general terms. I estimate the area of that portion included from north to south between Wintering and Cross lakes, and from east to west between Setting and Sipiwesk lakes at 2,000 square miles. An analysis of its soil types appears later in this report.

NATURAL RESOURCES.

ECONOMIC DEPOSITS.

Judging by such necessarily superficial observations as the members of the party were able to make, the region we covered is not well supplied with economic minerals. Traces of copper were found at Wekusko lake, and samples of iron ore at Sipiwesk lake, and careful prospecting might perhaps disclose deposits of commercial value, but everywhere else so far as observed, the obtruding bedrock was either pure granite or limestone. The latter, however, is mostly dolomite, the variety used as a flux in the reducing of iron ores, and future ore discoveries may give rise to such demand. This dolomite also will prove a valuable building stone for prairie towns, when made available by the Hudson Bay railway.

FISHERIES.

The deeper lakes all abound in whitefish of the finest size and quality. In Paint lake during the mayfly season (July up there) their dorsal fins could be seen cutting the water everywhere. Pickerel, and of course jackfish and suckers are likewise very abundant. We had no sturgeon net but saw quite a number jumping in Sipiwesk lake.

Altogether the fishing industry should be a decidedly profitable one after the railway goes through.

GAME AND FURS.

Much of that region is suited only and admirably to producing a permanent revenue from this source.

The beaver have been almost exterminated but mink, fisher, muskrat and other fur-bearers are still fairly numerous.

As to large game, moose and caribou are plentiful, but we saw no elk or bear. More stringent game laws will shortly be necessary with the opening of the country to white hunters.

SUMMER RESORTS.

Nearly all those northern lakes are thickly studded with beautiful islands—quite a similar Laurentian country to Muskoka but on a more extensive scale. Some future day these large island studded lakes will become popular summer playgrounds for the people of the prairies, for the July and August weather is delightful. As yet of course they are almost inaccessible.

TIMBER—GENERAL STATEMENT.

Species, Quality and Quantity.—In the region we traversed, only five species, namely: spruce, poplar, tamarack, birch and jackpine have any possible commercial value, and of those, speaking generally, only the spruce is large enough for sawmill purposes or railway tie material.

The poplar, birch and pine are invariably too short, spindly, limby and crooked for any use save fuel or pulpwood, and what mature tamarack there was is now standing dead from insect attack. We did not find over 200 green tamarack above 10 inches diameter all summer. This remnant is on the northeast end of Bear island in Sipiwesk lake. Black spruce is easily the predominant species in all that region, except on very occasional well-drained tracts of spruce-flat type, (where it reaches 10 to 14 inches diameter at breast height) it is a small spindly tree, only 4 to 8 inches diameter breast height at maturity, useless even for second class ties. This is the condition in which the jackpine also occurs.

The white spruce therefore is the only species large enough to furnish construction timber, sawlogs, or even railway ties, and the supply is very limited. In the first place this species occurs only on the best drained spots, such as river and lake margins or on the small islands, and in the second, the fires of the past 100 years have destroyed nearly all the old stand.

To sum up then, only a mere fraction of one per cent of the area we surveyed, now carries merchantable timber—a fringe along the Lower Mitishto and Upper Minago rivers, and on a few of the islands and peninsulas in the larger lakes—as shown on the map. There is probably enough timber available to build the rough construction work of the Hudson Bay railway.

OTHER FOREST PRODUCTS.

Fuel.—From the mere size of the country and the density of the oncoming second growth stands the possible supply of firewood is enormous. Because of its remoteness from settlement, however, it has no present commercial value.

Piles. Owing to the killing by bark beetles of practically all the larger tamarack (or possibly killed by larch sawfly previous to beetle attack, though we found no trace of the sawfly) there is almost no green pile timber of any value in the whole region. Hence unless by importation the only choice left is between dead tamarack and the largest of the close-grained black spruce. The latter would remain sound in soil contact for about ten or twelve years which would satisfactorily cover the first initial experimental stage in the operation of the new road.

Pulpwood. Just at the present time, within the area we inspected, the timber is too young and small upon the whole to be cut at a profit even for pulpwood. But in the absence of fires for twenty years the now eighty-year old stands of 4 to 8-inch timber can be profitably cut for this purpose, and it is probable that within the next quarter of a century part of the enormous energy now running free in the falls and rapids of the Nelson and Grass rivers will be harnessed to drive pulp and paper mills.

Young growth. The age of the reproduction is in nearly every case a measure of the time which has elapsed since the last destructive fire occurred. As a general rule, to which, however, there are endless local exceptions and variations—the young growth is approximately either forty or eighty years of age; the former being now 1 to 4 inches in diameter, and the latter 4 to 8 inches, but none yet large enough for making railway ties. It will, however, soon be suitable for pulpwood.

Scattered trees from older stands occur in this second growth, but not in sufficient number to repay the cost of lumbering.

Growth rate. —The rate of growth in the very dense stands that are usual in that latitude is decidedly slow except where the soil and drainage conditions happen to be just right. Black spruce on semi-muskeg, a site of average quality for that species, is only 4 to 5 inches in diameter breast height at one hundred years. White spruce is rather fastidious regarding moisture conditions and only appears on fairly well drained spots attaining there a size of 8 to 12 inches diameter within a century. Poplar in that time reaches 8 to 10 inches. As for jack pine occasional trees reach 12 to 16 inches, but only after long immunity from fires, and such trees are too limby for use. I saw no jackpine stand where the trees would average even 6 inches in diameter.

If the general drainage conditions could in some way be improved so as to partially replace the unprofitable black spruce with the white species, the wealth producing power of the region would be immeasurably greater

FOREST ENEMIES.

Fire, insects and wind in the north country are all very destructive agents and all inter related.

Bark beetles have not only destroyed practically all the large tamarack, but are everywhere actively at work to-day killing off the scattered patches of mature spruce which have escaped past fires.

The fire loss and danger is appalling. Within the past century two great general conflagrations, along with numerous intermediate fires, have reached every nook

and corner of the vast region we traversed. Many instances were seen where the fierce conflagrations of some forty and eighty years ago had jumped lakes over a mile across. These great periodic fires accompany each cycle of very dry seasons living in the deep moss during the winter and rushing hither and thither in summer.

Where the soil is thin, or as frequently seen, only a layer of more or less decayed moss on the ledrock, a fire is disastrous, the root zone being destroyed. And a fire up there is easily started for the whole lower half of each spruce or larch tree in the dense young stands which prevail, is a highly inflammable plume of dead twigs, moose moss, and lichens.

The bark beetles work in colonies, destroying the trees, and the moment they create an opening in the close-growing stand each following wind storm (and they

PLATE V

Jackpine Ridge (Fire swept.) Showing rocky soil exposed but no windfalls as yet.

are frequent) mows down its quota of trees. Finally a stroke of lightning sets fire to the whole tangled moss-covered mass of fallen and up-rooted debris, usually not only consuming it and much of the soil as well, but eating far and wide into the green timber. Then, reproduction being everywhere prolific, a dense young stand springs up on the ruins of the fire and nature's slow cycle of growth and decay begins all over again.

CLIMATE AND NATURAL PRODUCTS.

The climate and the soil conditions are the two basic factors which determine farming value. Where frequent or recent fires have not resulted in the formation of purely 'temporary' or 'fire types' —as e.g., young jackpine on heavy clay —a study of the existing flora answers many questions as to the climate and the soil.

On well-drained spots as far north as Split lake the flora is almost identical with that of similar sites in the Riding Mountains of Manitoba, proving that during the growing season these localities lie under one and the same isotherm, or nearly so. And yet the Riding Mountains are nearly four hundred miles southwest of Split lake.

Two other factors which help vegetation in this northern clay belt are the low absolute elevation—only 500 to 700 feet—and the large proportion of sunlight during the growing season, because of the long day. No doubt also the large proportion of the country covered by water has a tendency to prevent late spring and early fall frosts.

In the absence of weather records, it is impossible to say whether the summer of 1910 was an average season or not, but certainly it was favourable for farming operations. There were showers every week and the growth of the native vegetation was amazingly rapid. The total annual precipitation including 2 or 3 feet of snow would appear to be about the same as for western Ontario, to wit, 30 to 40 inches.

At Cross lake no damaging frosts occurred between June 8 and September 11, an interval of ninety-three days. But as a 'sixty-day' oat or barley in Ontario will mature in that region in forty-five or fifty days—a general rule which applies as well to fruits, roots and vegetables—there would appear to be no difficulty from a climatic standpoint in growing all the hardier products of the temperate zone

The size and quality of the wild fruits between Setting and Split lakes was first-class. During the last week of July we enjoyed ripe raspberries, gooseberries, black and red currants, blueberries, saskatoons and strawberries (late ones).

The first three mentioned were especially fine—the bushes loaded down with fruit as large and juicy as many tame varieties in Ontario. average temperature of the growing season is about 60° Fahrenheit.

Certainly vegetables will grow to perfection anywhere between Cross lake and Nelson House. At the former we ate potatoes weighing a pound and a half each, dug on the last day of August, and when we left on September 10 the corn and tomatoes were still untouched by frost. I would respectfully point out the advisability of the Dominion government placing several small experiment stations at suitable points within the limits of this clay belt to make careful test of its seasonal variations and cropping possibilities. When the railway is completed such information will be of the utmost value to intending settlers.

As in all other northern districts one great drawback will be the insect pests. Mosquitos, 'bulldogs,' deerflies and gnats abound. It is doubtful, however, if they are as bad as in parts of New Ontario now being settled and farmed.

The winters are quite as enjoyable as in Manitoba—probably more so. Mr. Clifford, one of the railway location engineers, who has spent two years between The Pas and Split lake assured me that he liked the winter season there much better than the summer.

SOIL.

With regard to soil conditions, drainage is the great necessity everywhere. To render the soil fertile for cropping, the heavy stiff boulder clay must be opened up to the action of the air. Probably the use of a sub-soil plow might obviate the necessity for underdrainage over large areas. But however secured, aeration is necessary to change the present cold, dead, impervious soil to a warm, porous, friable one, full of bacterial life, available plant food, and resulting fertility.

The soil is exactly similar to that around Cochrane in New Ontario which yields such large returns under right treatment.

FIRE PROTECTION.

The conditions met with in the region traversed by the party may be described as follows:

It is a huge wild region, practically uninhabited and with absolutely no trails, roads or other means of rapid communication. There is not yet an established settler north of The Pas.

During the summer months the native Indians are gathered round the fur trading posts, or are engaged in transport work along the main trade routes. Generally speaking, they roam the forests only in the winter trapping season when it is impossible to set fires. I am aware there are many opinions as to the relative culpability of Indians and whites in the setting of bush fires. The truth is that each race has its quota of careless individuals. In my experience the pure blooded Indians are very careful about their camp fires; the halfbreeds are not.

PLATE VI.

Mitishto River, showing saw and tie timber (spruce.)

Travel in that region during the summer months is practically all confined as yet to the several main canoe routes, and it may be assumed that all the local forest fires caused by the agency of man start from the unextinguished camp fires along these water highways. We met several trading, prospecting or engineering parties passing up or down the Nelson, one of which contained forty men. When one remembers that hundreds of camp fires are lighted, annually, along this great river thoroughfare, and that many of these are left to 'burn themselves out,' the entire absence of mature timber along its banks is no longer a matter of surprise.

In the dry season the forest conditions in the northland offer a constant invitation to fire. The timber is nearly all small, of coniferous species, and in dense stands—a highly inflammable combination. The whole lower half of each tree is a veritable tinder box of dead, dry twigs and moss, and nearly everywhere there is more or less standing or fallen debris to increase the intensity of the fire.

The uniform topography and the prevalence of high winds are other factors which favour the occurrence of extensive forest fires. Not infrequently a forty to fifty miles gale from Hudson bay blows for three or four days continuously. There is always a breeze from some quarter.

Another important climatic feature in dry seasons is the frequency of severe electrical storms. Last summer we saw scores of trees that had been struck by lightning in past years. There is little doubt this agency is responsible for many fires both in our northern woods and in all high mountain forests. I have personally seen a thunder cloud start five fires in fifteen minutes, while passing along a mountain side in the Selkirk range of British Columbia, and three of these later developed into serious forest fires.

A study of the existing young growth in the north proves that the fire damage occurs in great periodic conflagrations during a cycle of dry seasons, rather than in approximately equal annual losses.

Over extensive areas of rocky country and muskeg the growth rate is very slow and the existing stand of timber has no present commercial value. Such tracts though virtually devoid of producing power, may not be left unguarded without seriously discounting the value of any efforts directed toward preserving the better areas. Considered as a whole, it is probable that the value of the region for pulpwood production, as well as the growing commercial value of its many game and fur animals, will justify the expense of fire protection and patrol so far as these are practicable. Against lightning for instance no protection is possible, nor can the country remote from waterways be patrolled.

Probably all that can be done, under present conditions, is to organize a more or less complete patrol of the main travelled canoe routes. There seems no valid reason why such a patrol might not be placed on all the important river highways of the north. Speaking of the need for such patrol work on the Nelson river, a writer in the Trail magazine well says:

> 'At present the only attempt at fire protection is in the posting of handbills warning travellers against setting fires and pointing out the penalty in this regard. But without some sort of police control these notices are just so much waste paper. If every Indian or other traveller along these streams was aware of the fact that at any turn on the river he might come across a canoe, manned by the law in the uniform of the Mounted Police or Dominion Forest Service, with authority to arrest and punish offenders against the regulations with regard to fire; or if such a patrol were known even to be on the river either ahead or behind there would be much more care taken with regard to leaving half-burnt fires when camp was broken. Regulations exert an immensely stronger moral effect when backed by the probability of early discovery, if disregarded. The installation of such patrols would be comparatively inexpensive.

These trade routes are well defined, few in number in comparison with the extent of country through which they run, and the policing of these routes would practically have the effect of protecting the entire country. For it is a noticeable fact that it is almost entirely from these trade routes that the fires are started.'

Supplementing such a patrol system for the prevention of fires, caches of tools should be installed at convenient points so that the means of fighting such fires as do start may be promptly available. Again, by erecting observation towers at suitable places the scope of the patrol could be made much more comprehensive and valuable. Plenty of fire notices should be posted, and those in Cree might advantageously be written both in syllabic and English characters.

The construction and operation of the Hudson Bay railway will add a new element of danger to these forests north of the Saskatchewan river, and every device and resource which can help to safeguard their future will be necessary, and should be duly and efficiently invoked.

Respectfully submitted,

J. R. DICKSON.

APPENDIX.

DETAILED STATEMENT OF MERCHANTABLE TIMBER—LUMBER AND TIES.

Species.—Practically restricted to white spruce (*Picea canadensis*). Where fire has allowed this species to reach maturity it is 12 to 24 inches on the stump, and tall and clear as a result of having grown in a dense stand.

(1) *Moose Lake System*—

The Pas to Clearwater lake; no trees over 6 in. D.B.H. worth lumbering.

(2) *Clearwater Lake*—

(*a*) No timbered islands;

(*b*) Scattered small patches of spruce along shore, estimated to contain 3,000 ties and 25,000 ft. B.M.

(3) *Cormorant Lake*—

(*a*) Islands and south shore (balance included in timber berth No. 1171) 1,500 ties and 10,000 ft. B.M.

(4) *Moose Lake*—

Estimated total amount of Crown timber available: 50,000 ties; 145,000 ft. B.M.

(5) *Along the Mitishto River*—extending out 8 to 10 miles from the stream on each on each side.

(*a*) *Upper Reaches*, i.e. between camp 3 and camp 8 –

	Ties.	Ft. B.M.
(*a*) Mitishto lake	1,000	
(*b*) Sunday lake	250	
(*c*) Thicket lake	250	40,000
(*d*) Camp 6 to 8	2,000	70,000
Total	3,500	110,000

(*b*) *Lower Reaches* of Mitishto, i.e. Camp 8 to 15 (all this timber lies within 10 chains of the river).

	Ties.	Ft. B.M.
(*a*) Camps 8 to 10	2,000	100,000
(*b*) Camps 10 to 12	2,500	50,000
(*c*) Camps 12 to 13	1,500	30,000
(*d*) Camps 13 to 14	3,000	60,000
(*e*) Camps 14 to 15: all muskeg to water's edge.		
	9,000	240,000
Total, Mitishto River System	12,500	350,000

(6) *Grass River System*

	Ties.	Ft. B.M.
(*a*) Wekusko lake	100,000	2,000,000
(*b*) Grass river	5,000	75,000
(*c*) Pakwahigan lake	15,550	1,050,000
(*d*) Hidden lake (only ties here)	4,200	
(*e*) Setting lake	20,000	290,000
(*f*) Grass river, between Setting lake and Paint lake	4,200	
(*g*) Paint lake	10,000	500,000
(*h*) Grass river, between Paint lake and Partridge Crop lake	1,100	
	160,050	3,915,000
Grass river and expansions—Partridge Crop and Split lakes:—		
(1) Partridge lake	1,050	
(2) Fruit lake	800	
(3) Upper Natawakoman lake	1,150	
(4) Lower Natawakoman lake	1,000	
(5) Natawakoman rapids	....	150,000
(6) Stinking lake	3,000	
(7) Grass river, Natawakoman and Split lakes	3,500	
(8) Split lake	2,500	
Total	13,000	150,000
Total, Grass River System	173,050	4,065,000

(7) *Inter-lakes System*—

(*a*) Moffat lake	4,500	25,000
(*b*) Wintering lake	32,000	887,000
(*c*) Landing lake (all tie timber)	7,700	
Total	44,200	912,000

(8) *Nelson River System*—		
(*a*) Split lake to Sipiwesk lake (no merchantable timber, all brulé).		
(*b*) Sipiwesk lake	55,800	1,785,000
(*c*) Nelson river, Sipiwesk lake to Cross lake	1,400	10,000
(*d*) Cross lake	9,550	272,000
(*e*) Pipestone lake	7,300	100,000
Total	74,050	2,167,000
(9) *Minago River System*—		
(*a*) At 1st and 2nd rapids above Hill lake	1,000	700,000
(*b*) At 3rd and 4th rapids	1,500	800,000
(*c*) At 5th and 6th rapids	500	250,000
Total	3,000	1,750,000

SYSTEM TOTALS.

1. Moose lake	54,500	180,000
2. Mitishto river	12,500	350,000
3. Grass river	173,050	4,065,000
4. Inter lakes	44,200	912,000
5. Nelson river	74,050	2,167,000
6. Minago river	3,000	1,750,000
Grand Total	361,300	9,424,000

PUBLICATIONS ISSUED BY THE FORESTRY BRANCH AND AT PRESENT AVAILABLE FOR DISTRIBUTION.

Annual Reports—Superintendent of Forestry—1904 and following years.

Bulletin 1. Tree-Planting on the Prairies—N. M. Ross.

" 2. Planting and Care of a Forest of Evergreens—A. Knechtel.

" 3. Dominion Forest Reserves—A. Knechtel.

" 4. Forest Products of Canada (up to 1908)—A. H. D. Ross.

" 5. Forest Conditions in Crowsnest Valley, Alberta—H. R. MacMillan.

" 6. Riding Mountain Forest Reserve—J. R. Dickson.

" 7. Forest Fires in Canada, 1908—H. R. MacMillan.

" 8. Forest Products of Canada, 1908— {H. R. MacMillan. G. A. Gutches.

" 9. Forest Fires in Canada, 1909— {H. R. MacMillan. G. A. Gutches.

" 10. The Farmer's Plantation—A. Mitchell.

" 11. Forest Products of Canada, 1909: Lumber, Square Timber, Lath and Shingles—H. R. MacMillan.

" 12. Forest Products of Canada, 1909: Pulpwood—H. R. MacMillan.

" 13. Forest Products of Canada, 1909: Poles—H. R. MacMillan.

" 14. Forest Products of Canada, 1909: Cross-ties Purchased—H. R. MacMillan.

" 15. Forest Products of Canada, 1909. (Being Bulletins 11, 12, 13, 14, 19 and 20).

" 16. Forest Fires and Railways—R. H. Campbell.

" 17. Timber Conditions on the Proposed Route of the Hudson Bay Railway—J. R. Dickson.

DEPARTMENT OF THE INTERIOR

FORESTRY BRANCH

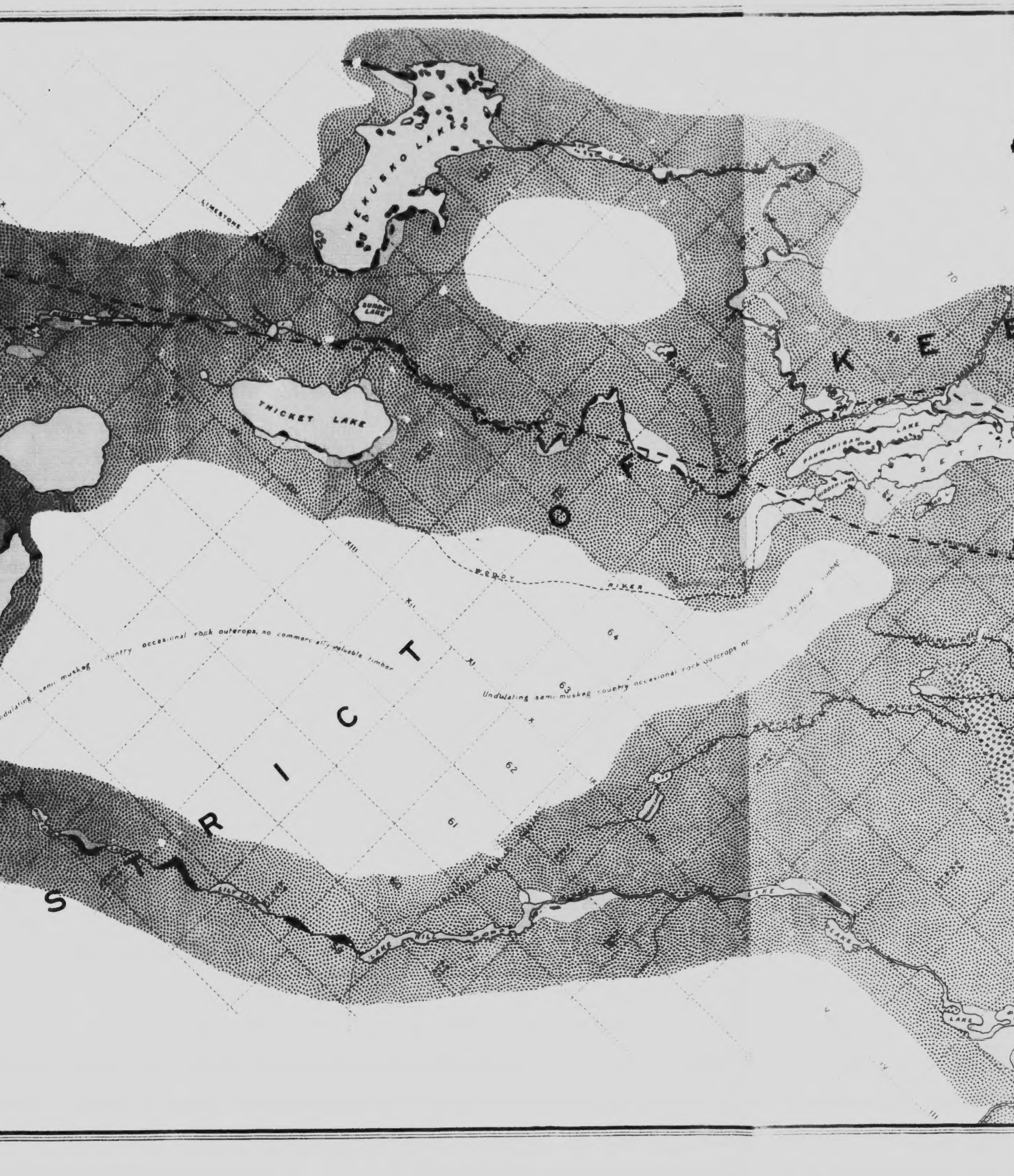
MAP TO ACCOMPANY BULLETIN No. 17

ON THE

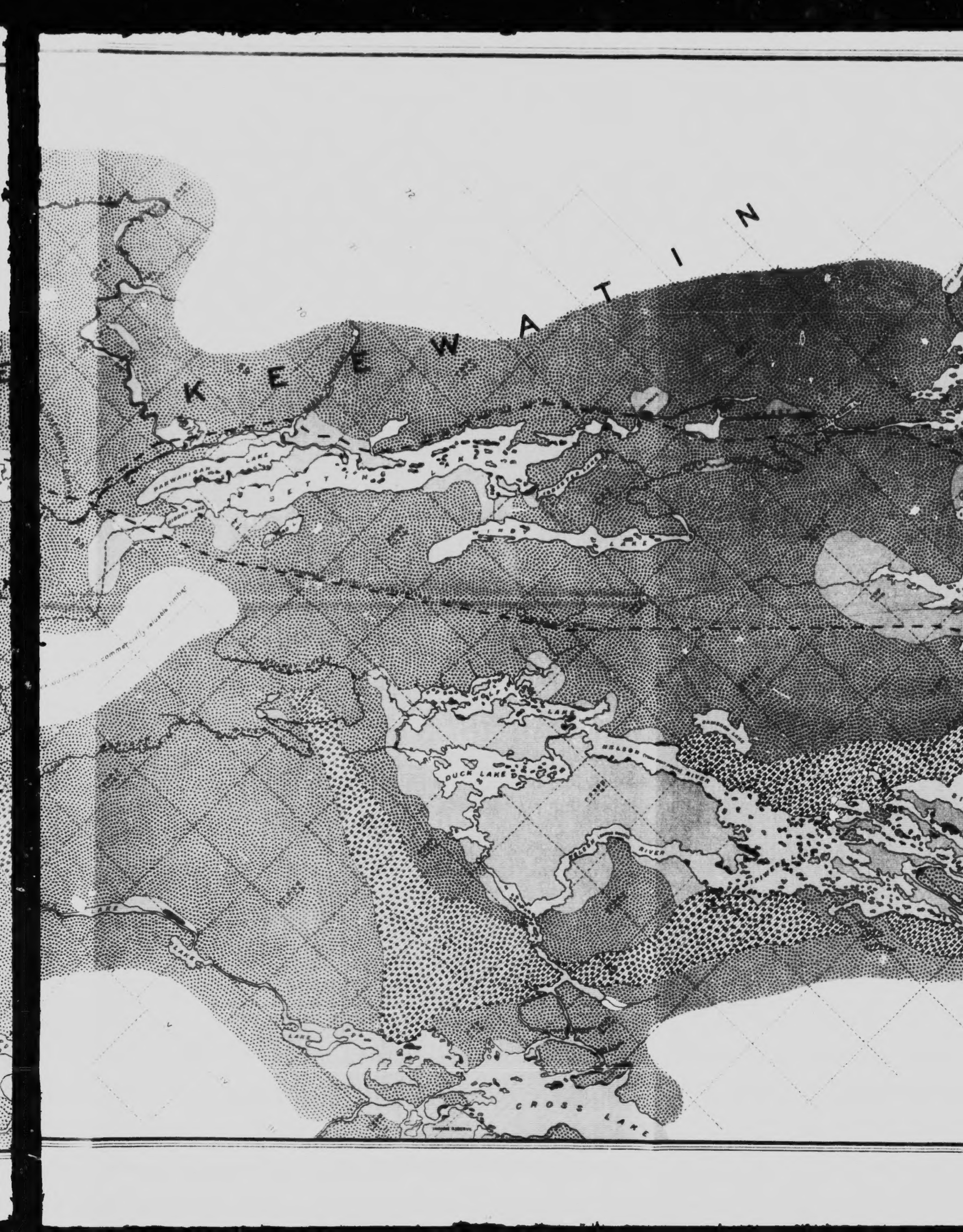
TIMBER CONDITIONS ALONG THE PROPOSED ROUTE OF THE HUDSON BAY RAILWAY

1911


CLEARWATER LAKE
CORMORANT LAKE
PAS MISSION
BIG LAKE
59
58
MOOSE LAKE
WEST ARM
SASKATCHEWAN
LAKE
REPORTED AREA OF GOOD SPRUCE
LAKE
54
53
52
51
50
49
MOOSE LAKE
EGG LAKE
EAST ARM
INDIAN RES.
RIVER
MUSKEG LAKE
CEDAR LAKE
CEDAR LAKE
CEDAR LAKE
T.B. 1107
T.B. 1106
63
XXVI
XXV
XXIV
XXIII
XXII
XXI
XX
XIX
XV
Undulating
D I



WEKUSKO LAKE
LIMESTONE
SUNDAY LAKE
THICKET LAKE
WOODY RIVER
PAKWANIKAN LAKE
HIDDEN LAKE
Undulating semi muskeg country occasional rock outcrops, no commercially valuable timber
Undulating semi muskeg country occasional rock outcrops no commercially valuable timber
S T R I C T
O F
K E E
S E T T
LAKE


KEEWATIN
DUCK LAKE
CROSS LAKE

Department of the Interior
Canada

HONOURABLE [illegible] Minister
W W Cory Minister

SKETCH MAP

SHOWING TIMBER CONDITIONS ALONG PART OF THE PROPOSED ROUTE OF THE

HUDSON BAY RAILWAY

PREPARED UNDER THE DIRECTION OF
R.H. CAMPBELL, DIRECTOR OF FORESTRY

SCALE 6 Miles TO AN INCH

1910

Surveyed by J.R. Dickson, M.S.F. [illegible]

Compiled by Geo. S. Pearce

LEGEND